Parts and Crafts

our programs

Parts and Crafts is a family makerspace and community workshop in Somerville, Massachusetts. We encourage kids to think and make and learn and do through the exploration of the arts, science, computer programming, and engineering.

in-school partnerships

Our school partnership programs aim to develop a series of "maker" projects can be integrated with existing curriculum to support STEAM learning in grades K-8 and make these programs more widely available.
What We Do

**Electronics**
- Simple DC circuits
- Voltage, current, resistance
- Simple sensors
- Robotics and physical computing

**Programming**
- Writing stories, animations, and video games in Scratch
- Teaching Python through Minecraft
- Java, Processing, Arduino

**Arts and Crafts**
- Sewing and fabric arts
- Mechanical papercraft
- Drawing, painting, stop-motion
- Jewelry-making

**Engineering**
- Take-apart, building, reverse engineering
- How do things move?
- Mechanical systems

**Design**
- 3D printing
- Intro to woodshop
- Layout and graphic design
- Invention and creation
Connecting to School

how do maker programs support traditional curriculum?

how do we leverage out-of-school resources to support these projects?
Examples

Grade 2: Earth’s Systems

- Compare the effectiveness of multiple solutions designed to prevent wind or water from changing the shape of the land.
- Map the shapes and types of landforms and bodies of water in an area.
- Use examples obtained from informational sources to explain that water is found in the ocean, rivers and streams, lakes and ponds, and may be solid or liquid.
- Observe how blowing wind and flowing water can move Earth materials from one place to another and change the shape of a landform.

Sample Projects

Build a Watershed

<table>
<thead>
<tr>
<th><strong>Goal:</strong></th>
<th>Design and build a watershed system out of foam blocks. System should include elevation change and a tributary system</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time required:</strong></td>
<td>3-5 days</td>
</tr>
<tr>
<td><strong>Tools and materials:</strong></td>
<td>Foam, hot wire cutters, glue, exact knives, paint</td>
</tr>
</tbody>
</table>

Sandbox Erosion

<table>
<thead>
<tr>
<th><strong>Goal:</strong></th>
<th>Build a portable sandbox system to model erosion with cornmeal, sand, and water.</th>
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<tbody>
<tr>
<td><strong>Time required:</strong></td>
<td>Pre-build the box system, designed for use with 1 hour demonstrations</td>
</tr>
<tr>
<td><strong>Tools and materials:</strong></td>
<td>Sandbox system, cornmeal, water.</td>
</tr>
</tbody>
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Grade 4: Physical Science

- Use evidence to construct an explanation relating the speed of an object to the energy of that object.
- Make observations to show that energy can be transferred from place to place by sound, light, heat, and electric currents.
- Ask questions and predict outcomes about the changes in energy that occur when objects collide.

Sample Projects

**Solar Powered Car**
- **Goal:** Build a solar-powered motorcar to test under artificial light
- **Time required:** 1.5 hours
- **Tools and materials:** Solar panel, wheels, motor, cardboard, decorative materials. Optional soldering component

**Build a Dynamo**
- **Goal:** Build a crank-powered dynamo to power an LED
- **Time required:** 1.5 hours
- **Tools and materials:** Wood scraps (for wheel and crank assembly), 12v motor, bolts, LED

**Pinball Machine**
- **Goal:** Build a wooden pinball machine with rubber band
- **Time required:** 1.5 hours
- **Tools and materials:** Wood scraps (for wheel and crank assembly), 12v motor, bolts, LED
Grade 7: Life Sciences, Ecosystems

- Analyze and interpret data to provide evidence for the effects of periods of abundant and scarce resources on the growth of organisms and the size of populations in an ecosystem.
- Describe how relationships among and between organisms in an ecosystem can be competitive, predatory, parasitic, and mutually beneficial and that these interactions are found across multiple ecosystems.
- Develop a model to describe that matter and energy cycle among living and nonliving parts of an ecosystem and that both matter and energy are conserved through these processes

Sample Projects

Sheep / Grass / Wolves

**Goal:** Write a Scratch simulation that models a predator-prey ecosystem with sheep, grass, and wolves.
**Based on:** https://scratch.mit.edu/projects/26812899/
**Time required:** 1 week
**Tools and materials:** Computer lab with access to Scratch

Modeling the Carbon Cycle

**Goal:** Write a Scratch simulation that models the carbon flow in a tree based on levels of photosynthesis.
**Based on:** http://www.carbontree.fi/
**Time required:** 1 week
**Tools and materials:** Computer lab with access to Scratch

Arduino Extension: Build a Controller

**Goal:** Build an Arduino-based controller that allows the user to manually change variables
**Time required:** 1 week
**Tools and materials:** Computer lab with access to Scratch, Arduino toolkit, sensors, resistors, various electronics components
Resources

Field Trip Programs

- Parts and Crafts is located at 577 Somerville Avenue, Somerville MA
- Access to 3D printing, woodshop, electronics workbench, soldering stations
- Fridays only, morning or afternoon available

On-site Programming

- Supplement in-school workshops with hands-on project component
- Good for: Table-top building projects, Scratch, computer programming, science demos
- Flexible schedule. Ideal times are late April / early May.

Professional Development

- What tools can I use? Scratch, 3D printing, Arduino, electronics
- Drop-in support at Parts and Crafts every Saturday from 12-2 pm
- Fridays only, morning or afternoon available